

operation of module" means a state where optical signals are transmitted from the laser and a sufficient eye opening is obtained after fiber transmission over a desired distance. Accordingly, this state means that the laser, the modulator, the temperature control system and the wavelength adjusting system are operated as designed under electric power supply. Further, "environmental temperature of the chip" indicates a temperature of a portion between a temperature control element such as a Peltier cooler for temperature control of the chip for physically holding the chip and the chip. Actually, the temperature indicated by a thermister in contact with a carrier for holding the chip is defined as a chip temperature as shown in Fig. 5 and Fig. 6. Actually, the temperature of an optical transmission device on which an optical transmission module is disposed often rises to 40 - 50°C or higher. Details for Fig. 5 and Fig. 6 will be described later.

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A stripe of 1.7  $\mu\text{m}$  width is formed at a depth of 1.9  $\mu\text{m}$  to the thus formed semiconductor layer 30, to constitute a waveguide. A protection film 29 for protecting the waveguide is formed, for example, with  $\text{SiO}_2$ . For forming the p-type

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*As*  
electrode 22, other portions than the waveguide stripe are flattened with a polyimide resin 28. Then, the p-type electrode 22 is formed. Finally, an n-type electrode 33 is formed at the rear face of the semiconductor substrate.

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